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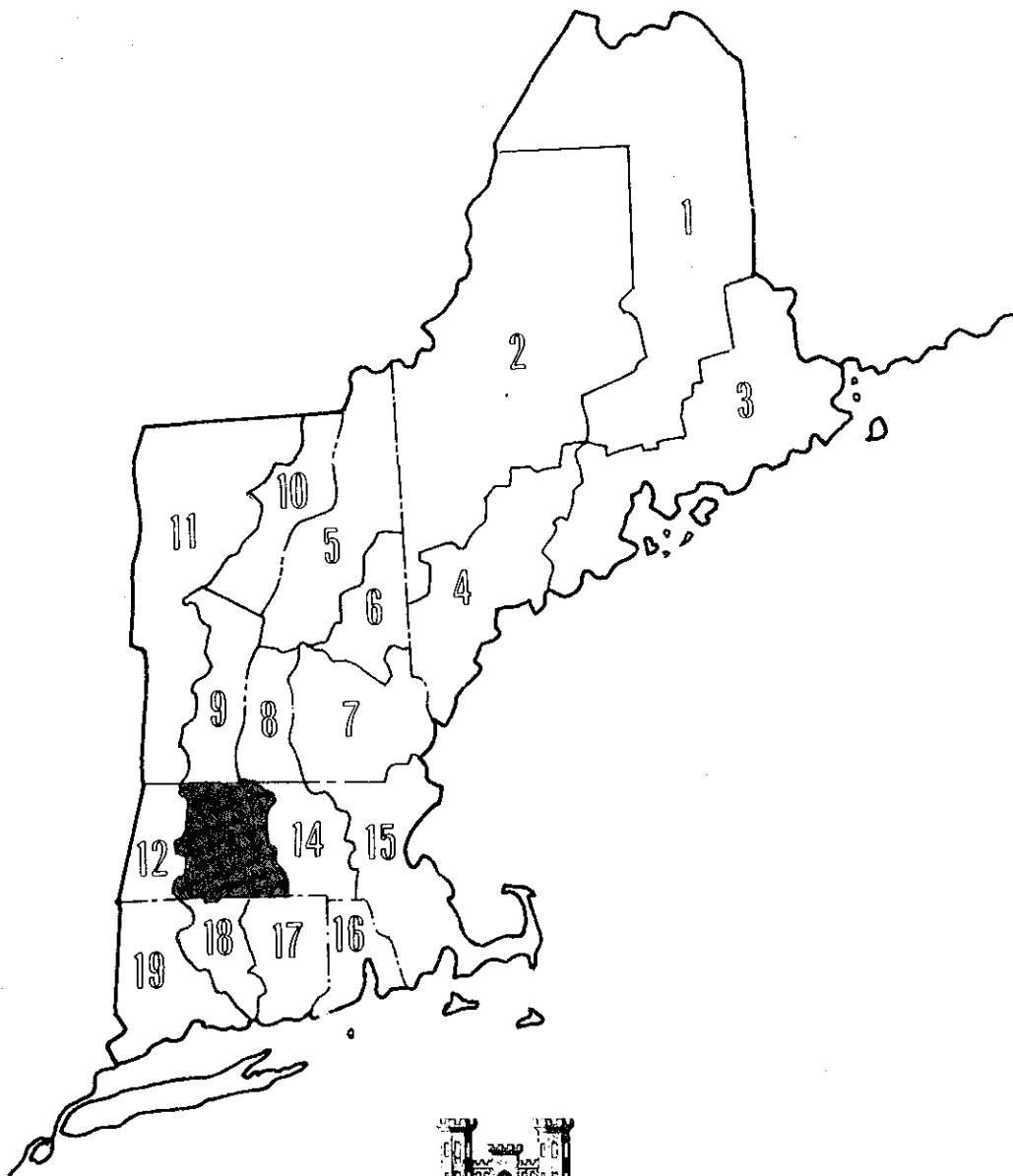
# NORTHEASTERN UNITED STATES WATER SUPPLY STUDY

## SPRINGFIELD-CHICOPEE

### HOLYOKE AREA

( PART OF OBE SUB-REGION 13 )

#### INTERIM MEMORANDUM NO.2



DEPARTMENT OF THE ARMY  
NEW ENGLAND DIVISION, CORPS OF ENGINEERS  
WALTHAM, MASS.

APRIL 1968

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INTERIM MEMO NO. 2

SPRINGFIELD-CHICOPEE-HOLYOKE AREA  
(Part of OBE SUB-REGION 13)

NEW ENGLAND DIVISION  
CORPS OF ENGINEERS, U. S. ARMY  
April 1968

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## ABSTRACT

The Springfield-Chicopee-Holyoke area is analyzed with respect to geographic, geologic and topographic considerations. Present populations and water supply requirements are discussed. Projections for future populations and water supply needs are presented through the year 2020.

Adequacy of the three major water systems is investigated and apparent urgent needs and future needs are discussed. Recommendations for funds are requested under "NEWS" legislation (P. L. 89-298) for further study for both urgent needs and future water supply needs of the area.

Springfield-Chicopee-Holyoke Area  
OBE Sub-Region No. 13  
Interim Memo No. 2

1. Purpose of Report

This Interim Memo is being submitted in accordance with scope of work detailed in memorandum dated 21 November 1967, as part of this Division's participation in the Northeast Water Supply Study for the New England area.

2. Scope of Studies

a. General Information. Studies and investigations of reconnaissance scope have been made to determine the projected water supply requirements and potential deficiency areas within the OBE Sub-Region #13 for the area of Springfield-Chicopee-Holyoke. The entire sub-region is composed of 69 municipalities, 5 cities and 64 towns. The population of the sub-region is primarily located within the Springfield-Chicopee-Holyoke urban complex. This complex consists at present of 16 municipalities, 5 cities and 11 towns, and reported a 1960 population which was 80% of the total sub-region population of 587,000. The future population trend is expected to cluster about this urban complex. It is estimated that 90% of the total sub-region population will be located in the Springfield-Chicopee-Holyoke area. Since the majority of the population will be located in this area and adjacent communities, this study has concentrated its effort on this urban complex. A listing of municipalities in the sub-region with their 1960 populations and a plan showing their location in the sub-region is shown on Plate No. I.

Personal contact and liaison was established with selected major municipal water departments, their engineering consultants, representatives of the Massachusetts Department of Public Health, members of the U. S. Geological Survey, members of the Department of Health, Education and Welfare and the Lower Pioneer Valley Regional Planning District Commission.

During meetings with the various municipal water departments, the aim, object, and purpose of the Northeast Water Supply Study was discussed and pledges of full cooperation were received. At these meetings, municipalities concerned outlined their present and future

water supply capabilities and presented their views on future problem areas. Valuable information in the form of architect-engineer reports, municipal reports and agency reports were also collected.

Although there are many industries in the area who now maintain their own water supply sources, the scope of this study did not permit evaluation of these user's future plans. This lack of information on potential future requirements for these users from the municipal systems is a major question mark. The evaluation of the water systems in this study, therefore, are based on projected population demands and presently serviced industrial requirements and do not include any major shift of industries now utilizing their own private supplies to the municipal systems.

b. Office Studies. Office studies included collection and evaluation of data received. Preliminary projections of water supply requirements and population for the individual systems and sub-region were prepared. Deficiency areas which may be developing with respect to source, conveyance and treatment facilities were determined. Proposals for plans and alternate solutions based on preliminary hydrologic and cost estimates were developed and are contained later in this report.

c. Field Reconnaissance. A field reconnaissance was made of the three major municipal water department facilities within the study area.

d. Topographic Surveys. Topographic information was obtained from U. S. Geological Survey maps scale 1:24, 000.

e. Geologic and Subsurface Information. Sub-surface data was obtained from U. S. Geological Survey publications, consulting engineer reports, and a report titled "Compilation of Geophysical Studies Conducted by Weston Geophysical Engineers, Inc. Throughout Massachusetts" prepared for the Massachusetts Water Resources Commission.

### 3. Prior Reports

Water Resources were considered in Part 2, Chapter XXI, "Connecticut River Basin," of The Resources of the New England-New York Region. This comprehensive report inventoried the resources of the New England-New York area and recommended a master plan to be used as a guide for the regional planning, development, conservation, and use of land, water and related resources of the region. Prepared by



the New England-New York Inter-Agency Committee, (NENYIAC), the report was submitted to the President of the United States by the Secretary of the Army on 27 April 1956. Part 1 and Chapter 1 of Part 2 are printed as Senate Document No. 14, 85th Congress, 1st Session. A "Report on Provision of Water in Littleville Dam and Reservoir, Middle Branch of Westfield River" was submitted in January 1961. The Littleville Dam and Reservoir was placed in operation in September 1965. Total storage capacity is 32,400 acre-feet, of which 9,400 acre-feet are allocated for water supply for the City of Springfield, Massachusetts.

#### 4. Description of Sub-Region No. 13

a. General. Sub-Region No. 13, Springfield-Chicopee-Holyoke, is located in West-Central Massachusetts, in the valley of the Connecticut River. The area includes the counties of Franklin, Hampshire and Hampden. The valley is bounded by hills on both east and west. On the east are the central uplands of Massachusetts, between 500 and 1500 feet high, and on the west are the Berkshire Hills rising to more than 2,000 feet in Berkshire County. Climate is generally moderate with average monthly temperatures ranging from 25°F. in January to 74°F. in July. Monthly rainfall ranges from 2.6 to 4.7 inches with the yearly average of 46 inches at Westfield being higher than the national average.

The area is predominantly rural in the northern half but highly industrialized in the south. The Connecticut River bisects the region from its northern border with N. H. to its southern border with Connecticut. The cities of Springfield, Holyoke and Chicopee are situated in the southern half of the region. It is this metropolitan complex which forms the industrial and urban center of western Massachusetts. Sub-Region #13 reported a population of 587,000 in 1960 of which 80% was located in the 16 municipalities in the study area which is a part of the Springfield-Chicopee-Holyoke Standard Metropolitan Statistical Area (SMSA). Projections prepared by Arthur D. Little, Inc. and submitted in their report "Projective Economic Studies of New England" indicate sub-region populations of 757,000 in 1980, 1,015,000 in 2000, and 1,375,000 in 2020. Urban population, primarily located in the Springfield-Chicopee-Holyoke area, is expected to increase from its 1960 level of 80% to 90% by 2020, of the total sub-region population.

b. Surface Water. The Connecticut River which bisects the sub-region into an eastern and western half is the largest river in New England having a basin drainage area of 11,250 square miles of which 8,284 square miles are noted at the Holyoke Dam. Four large tributaries of the Connecticut River drain the region. These are the Deerfield, Millers, Chicopee, and Westfield Rivers. The largest of these is the Chicopee.

River draining 721 square miles and the smallest is the Millers River draining 392 square miles. A large portion of the Chicopee River drainage area totaling 284 square miles provides the source for the Quabbin Reservoir, the principal source of supply for metropolitan Boston. About 102 square miles of the Westfield River has been developed for use by the Springfield system.

c. Ground-Water Geology<sup>(1)</sup>. There are three major groups of rocks in the Springfield-Chicopee-Holyoke area and some ground water is obtainable from parts of each of the three groups. The youngest group consists of clay, sand, and gravel - all unconsolidated rocks - of Pleistocene (glacial) age. These rocks underlie the surface of most of the area in the Springfield-Chicopee-Holyoke vicinity and are generally between 30 and 200 feet in thickness. The second and next older group are of Triassic age and consist mainly of red or grey shale and sandstone. Diabase, also part of the Triassic age group of rocks, underlies the Holyoke Range. The Triassic Rocks fill a roughly, wedge-shaped trough to a depth of some thousands of feet beneath the Connecticut valley in south central Massachusetts. Finally, the third and oldest, deepest and thickest group of rocks in the area are crystalline rock types such as schist, gneiss and granite. However, these rocks occur at or near the land surface in the uplands, east and west of the Connecticut Valley.

d. Existing Wells. The five existing wells reported to have the largest yields in the area (each more than 800 gallons per minute) withdraw water from sand and gravel in Westfield and Southwick areas. These wells penetrate between 50 and 110 feet of water bearing sand and gravel, a saturated thickness greater than usually encountered in other places in the area. The quality of the ground water in the area varies. Although it is harder than the water from streams, it is more constant in composition and temperature. In a third of the 23 wells sampled by the Geological Survey, the water was found to contain a high concentration of iron. In 15 of the 23 wells, the hardness was over 60 parts per million.

## 5. Present Water Supply Systems

a. General. The Springfield-Chicopee-Holyoke portion of sub-region #13 has three major water systems presently supplying water to the various municipalities. These are the Water Departments of the cities of Springfield, Chicopee and Holyoke. The location of these systems is shown on Plate No. II.

(1) U. S. Geological Survey Water Supply Paper 1670

b. Springfield System. The Springfield system, as it exists at present, supplies all or part of the water supply demand of seven municipalities, two cities and five towns, with a 1960 population of 240,000. These municipalities are Springfield, Agawam, East Longmeadow, Longmeadow, Ludlow, Southwick and the unserved portion of Westfield. In addition to the presently serviced municipalities, the system is also obligated to supply water to three other towns, and the rest of Westfield, total 1960 population 30,000, if requested to do so. These municipalities which may connect to Springfield's system are Westfield, Chester, Huntington and Russell.

The Springfield system's main source of water is Cobble Mountain-Borden Brook Reservoir located on the Westfield Little River. Together, these reservoirs have a combined capacity of 25,300 million gallons and an estimated safe yield of 33 to 35 mgd. The recent addition of the Corps of Engineers' Littleville Reservoir to this system is expected to add a yield of 20 mgd by 1968 with an ultimate potential of 30 mgd. Water is drawn from the Cobble Mountain-Borden Brook complex to a treatment plant where the slow sand filters have a rated capacity of 55 mgd. The conveyance system has a nominal capacity in excess of 125 mgd from the treatment facilities to the terminal reservoir and thence approximately 160 mgd to the distribution system. About one-half of the conveyance capacity is located in a 60" aqueduct which was placed into service in 1963. Since one of the other two transmission lines was laid in 1909, its age was undoubtedly a major consideration in sizing of the new line. The Ludlow reservoir supply, a smaller satellite unit within the Springfield system has a capacity of 2,000 million gallons and an estimated safe yield of 5 to 7 mgd. This older supply unit provides water for only Ludlow and a portion of the year to the Monsanto Chemical Company in Springfield.

c. Chicopee System. The Chicopee system draws its water supply from <sup>(1)</sup>Quabbin Reservoir which is the principal water supply source for Boston. The Chicopee Valley aqueduct, a 36" conveyance line supplying the city of Chicopee, also serves two small municipalities, Wilbraham and South Hadley Fire District No. 1. The total 1960 population served by the aqueduct was 80,000, of which 63,000 were served by the Chicopee Water Department. The 36" aqueduct was, because of hydraulic considerations, unable to supply the Chicopee system requirements during the recent drought and restrictions on water use were required.

d. Holyoke System. The Holyoke system, as it exists at present, supplies all of Holyoke's demand. It is also required to supply a maximum supply of .62 mgd to the town of Southampton. The total 1960

(1) Metropolitan Boston 1960 System Pop. 1,705,000

population served by the system was 54,000. Holyoke is supplied chiefly by the Tighe - Carmody<sup>(1)</sup> and White Reservoirs on the Manhan River. Together, these reservoirs have a combined capacity of 5,400 million gallons and an estimated safe yield of approximately 13 mgd.

#### 6. Projected Future Water Requirements

The population projections and future water requirements presented in this report are of a preliminary nature and do not include any possible shift of industries which now possess private water supplies, to the municipal systems. The projections and future water demands are, however, of sufficient accuracy to provide a reasonable comparison between available resources and future requirements affording an outline of potential deficit areas.

The population projection<sup>(2)</sup> (in 1,000's) for the three major Springfield-Chicopee-Holyoke area water systems with their present service coverage of 4 cities and 8 towns is as follows:

	Population (2)				
	1965	1970	1980	2000	2020
Springfield System	251	266	293	339	393
Chicopee System	64	76	83	93	107
Holyoke System	57	57	57	58	60
Totals	372	395	429	490	556

The projected water demand of the systems with service areas as at present are given in the following table. The projected water demand includes continuing service to industries presently supplied. These industries at present account for approximately 35% of the Springfield system, 41% of the Chicopee system and 19% of the Holyoke system total water demand. The table, however, does not include future needs of industries not presently serviced. Water Supply Memo #1 developed for the Connecticut River Comprehensive Water and Related Land Resources Investigation indicates industrial requirements for water supply will increasingly rely more upon the municipal systems.

(1) Shown as Manhan Reservoir on Plate No. 5

(2) Lower Pioneer Valley Regional Planning District Projections

The projected water demand in mgd is as follows:

	<u>1965</u>	<u>1970</u>	<u>1980</u>	<u>2000</u>	<u>2020</u>
Springfield System	41	48	56	74	94
Chicopee System	11	13	15	17	19
Holyoke System	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>
Totals	62	71	81	101	123

Population projections for those municipalities with an option to connect to the Springfield system are as follows:

	<u>1965</u>	<u>1970</u>	<u>1980</u>	<u>2000</u>	<u>2020</u>
Chester	1150	1200	1200	1200	1200
Huntington	1450	1400	1400	1400	1500
Russell	1500	1500	1500	1800	2100
Westfield	<u>28000</u>	<u>30000</u>	<u>34000</u>	<u>41000</u>	<u>48000</u>
Total	32100	34100	38100	45400	53800

## 7. Water Systems Capability to Meet Projected Demands

a. Springfield System. This system is the largest in the study area. In addition to the seven presently serviced municipalities, the system is also obligated to supply water to three other towns. If all municipalities presently being served and those with an option, choose to connect to the system, the total population on the system as projected would be 332,000 in 1980 and 450,000 by 2020. The Springfield system therefore has a potential demand by 1980 of from 56 to 58 mgd, depending upon which unserved towns connect to the system. With the addition of diverted flows from the Middle Branch of the Westfield River by way of Littleville Reservoir, the safe yield of the existing system is calculated to be 58 to 62 mgd.<sup>(1)</sup> Based upon the water demand projections, it appears that the Springfield system in terms of source capacity is able to meet demands through 1980. Full development of the Middle Branch source will yield a potential capacity of 68 to 72 mgd,<sup>(1)</sup> which would meet requirements from a source viewpoint to somewhere in the neighborhood of 1990.

The conveyance system with a nominal capacity in excess of 125 mgd from the treatment facilities to the terminal reservoir and thence approximately 160 mgd to the distribution system is considered adequate through 2020 for domestic needs and those industries presently being serviced.

(1) Average Annual Demand

The only facility of the system which would not be adequate by 1980 is the treatment plant filters currently having a nominal capacity of 55 mgd. The system's maximum daily demand by 1980 is expected to be approximately 96 mgd. Utilizing existing filters, it is estimated that the maximum daily demand will be overtaxing the system's treatment facilities by about 1975.

Concerning the inadequacy of the current filtering system, it should be noted that in 1966 the city expanded upon its filtering facilities, at a cost of some \$2 million. A 1966 A&E study entitled "Preliminary Investigation of Water Resources" by Hazen and Sawyer to the City noted that the system should be expanded and designed to meet future peak loads. Accordingly, we find this facility to be one of the urgent requirements in the water supply system.

b. Chicopee System. The Chicopee Water Department reported that during the recent drought the city was unable to meet its supply requirements from the "Chicopee Valley Aqueduct." During the drought, much water was drawn from Quabbin's storage in order to meet Boston's needs. This reduction in storage and accompanying lowering of water surface elevations reduced the head upon the "Chicopee Valley Aqueduct" and thus produced the deficit to the Chicopee system. With a recurrence of a drought of proportions such as recently experienced, or for that matter increasing consumption rates of both Metropolitan Boston and Chicopee areas, the present conveyance system is considered inadequate. In addition to the presently served municipalities, Amherst with a projected 1980 population of 44,000, is looking to the aqueduct as a possible additional source of water for its system, thus possibly intensifying the situation.

c. Holyoke System. Population growth in the Holyoke system has been on the decline since after 1948 and with it an accompanying declining water consumption trend. If trends continue, we conclude that the Holyoke system would be adequate up to the 1980 period.

#### 8. Communities Not Presently Served by the Springfield-Chicopee-Holyoke Systems.

There are a total of 69 municipalities consisting of 5 cities and 64 towns in OBE Sub-Region #13. Most of these municipalities are rural in nature with only 6 municipalities reporting populations greater than 20,000 in 1960, and all of these are located in the Springfield-Chicopee-Holyoke urban complex. This population cluster about the metropolitan

heart of the sub-region is expected to continue in the future.

As populations increase, the communities which border the Springfield-Chicopee-Holyoke urban core will take on greater significance as the influence of the core extends to them. These towns with a projected 2020 population of 300,000 in general are presently able to meet their water requirements from ground water sources. In the future, however, this source may be unable to meet their needs. Extension of one or all of the 3 major water systems to these towns is a possible solution to their future water problems.

Municipalities in the sub-region which are not located in proximity to the urban core are expected to retain their rural nature. These communities number approximately 35 and their total 2020 population is expected to be about 100,000. The rural nature of these towns doesn't appear to lend itself to a regional water supply system.

#### 9. Conclusions:

a. Springfield System. This system should be adequate to meet its present system commitments until 1980 except for its treatment facilities which will be inadequate by 1975. Full development of presently available sources should prove adequate to about 1990; beyond this time period additional source would be needed. Existing conveyance facilities should serve the system through 2020.

The Springfield system appears to be a reasonable choice for future regional water supply development west of the Connecticut and south of Holyoke. However, many of the municipalities which may in the future be obliged through necessity to connect to the system, appear at this time willing to deal with their own requirements. The two largest of these municipalities, the city of Westfield and the Town of West Springfield, with projected 1980 populations of 34,000 and 35,000 respectively, are presently embarked on programs which would meet their requirements to the years 2000 and 1990 respectively.

Both of the municipalities are basing their future water supply on ground water sources. The ability of these sources to supply the quantity desired is a key factor to the future development of the Springfield system. One city, West Springfield, apparently is already in trouble securing its requirements, as it is presently in litigation with the Town of Southwick over use of a well field which lies within Southwick's boundaries. The rendering of an adverse decision by the Court might force West Springfield to seek additional supplies from the Springfield system.

It would appear that the conditions as they exist today might warrant further study for the potential development of the Springfield system to enable it to serve, if needed, other communities west of the Connecticut which lie in proximity to the system.

b. Chicopee System. The Chicopee system, which is served through the Chicopee Valley Aqueduct, was faced with many restrictions during the recent drought. The City of Chicopee and the Metropolitan District Commission are at present trying to determine methods of correcting this problem to preclude a recurrence of this shortage in the future. The inadequacy of this conveyance, however, is considered an urgent need.

Quabbin Reservoir has a large storage capacity, 412 B. G. , and by diverting flows from other drainage areas such as from the Millers River by way of Tully Dam it appears to be a good source for extension of the Chicopee Valley Aqueduct service area. The possibility of obtaining water from Quabbin was noted in an engineering report by Tighe & Bond, Consulting Engineers, as a potential for the Town of Amherst whose 1980 population is projected as 44,000. Development of a regional system would depend primarily, however, on increasing the yield of Quabbin.

It is felt that the Chicopee Valley Aqueduct could possibly serve as a regional water supply system to those municipalities not presently serviced by the Springfield water system east of the Connecticut River and south from the Town of Amherst. This area may comprise a total of 13 new towns with a 2020 population of 200,000.

The plan of development of this system is not within the scope of this report and further study would be required. In any further study, the expansion of Quabbin Reservoir sources would by necessity be an integral portion of the study. The study on expansion of Quabbin sources would have to be tied in with the needs of OBE Sub-Region #15 as Quabbin serves as the source for the majority of that sub-region's requirements.

c. Holyoke System. The Holyoke system, because of the decline in consumption and population, appears to be adequate for the future. There does appear to be possibilities for extending the system to service other municipalities. This extension might aid in relieving some of the load of the Chicopee Valley Aqueduct or might service West Springfield's needs if necessary.

d. Further Study. The urgent needs (1980) developing in the sub-region are notably the filters of the Springfield system and the conveyance line supplying the Chicopee system. In addition to these apparent



needs extension of the systems to other than presently serviced municipalities appears to be the best solution to dependable water supply in the sub-region. It is obviously beyond the scope of this report to make a complete engineering evaluation of the three water systems' potential. In order to insure optimum development of the three systems, further study would be required. From this additional study, a plan for complete development of the water resources of the sub-region would be evolved along with specific plans and alternates.

These alternatives which this further study would investigate are as follows:

1. Springfield Water System

- a. Expansion of treatment facilities is required to meet an urgent need estimated for 1975. If it was decided to expand the system beyond its present coverage, these facilities would have to expand to keep pace.

- b. Renovation of Ludlow Reservoir and works would add to the yield of the system and would probably continue to be able to serve its present service area even as the consumption rises, thus relieving the Little River supply of this eventual burden.

- c. Expansion of source supply by diversions within the Westfield River Watershed would enable the system to expand its service coverage. Some candidates for this broader system might be West Springfield, and Westfield.

- d. Expansion of system coverage is a potential plan which could either provide required additional supplies to other systems or as a supplement during peak or drought periods.

- e. Reduction of system coverage might be a plan whereby other systems, as an example Chicopee, would serve a portion of the system now served by Springfield thus relieving Springfield from expanding its facilities to meet future needs.

- f. Reinforcing interconnections would provide additional protection for the municipalities in the event of natural disaster, drought or national emergency.

## 2. Chicopee Water System

a. Improvement of hydraulic properties of the existing aqueduct, by perhaps pumping or by additional diversions to Quabbin, would probably enable Chicopee to meet its requirements.

b. Construction of a reinforcing conveyance for the present system to meet future needs.

c. With either of alternative a or b above, the potential of expanding existing coverage should be explored. Some towns, Amherst for example, would probably desire to join a regional network of this type.

d. A portion of Chicopee's needs might best be met by a connection and working agreement with the Springfield system. The nature, extent and size of the interconnection would depend on the other alternates development.

e. An interconnection with the Holyoke system might prove of benefit to both systems.

## 3. Holyoke Water System

a. With a detailed study of Holyoke's population and water consumption trends, it might prove possible to extend the system to other municipalities. West Springfield and Chicopee might be candidates for such an expansion.

b. The abandonment of in-town terminal reservoirs might be required because of human encroachment and quality problems. If these reservoirs were abandoned, conveyance lines might be required.

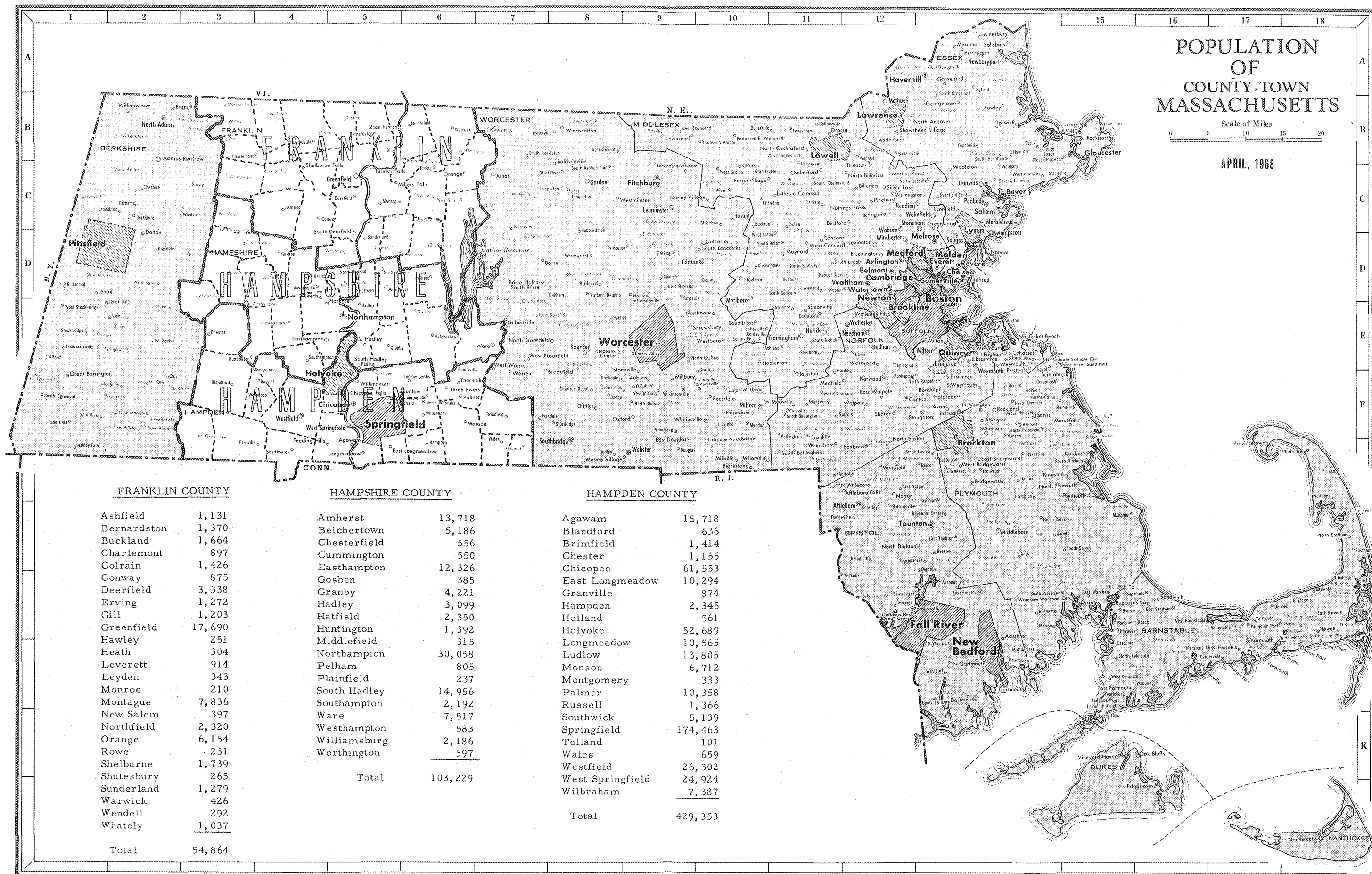
c. Once again, depending upon future projections, reinforcing of the conveyance system might be required for an adequate supply.

## 10. Recommendations

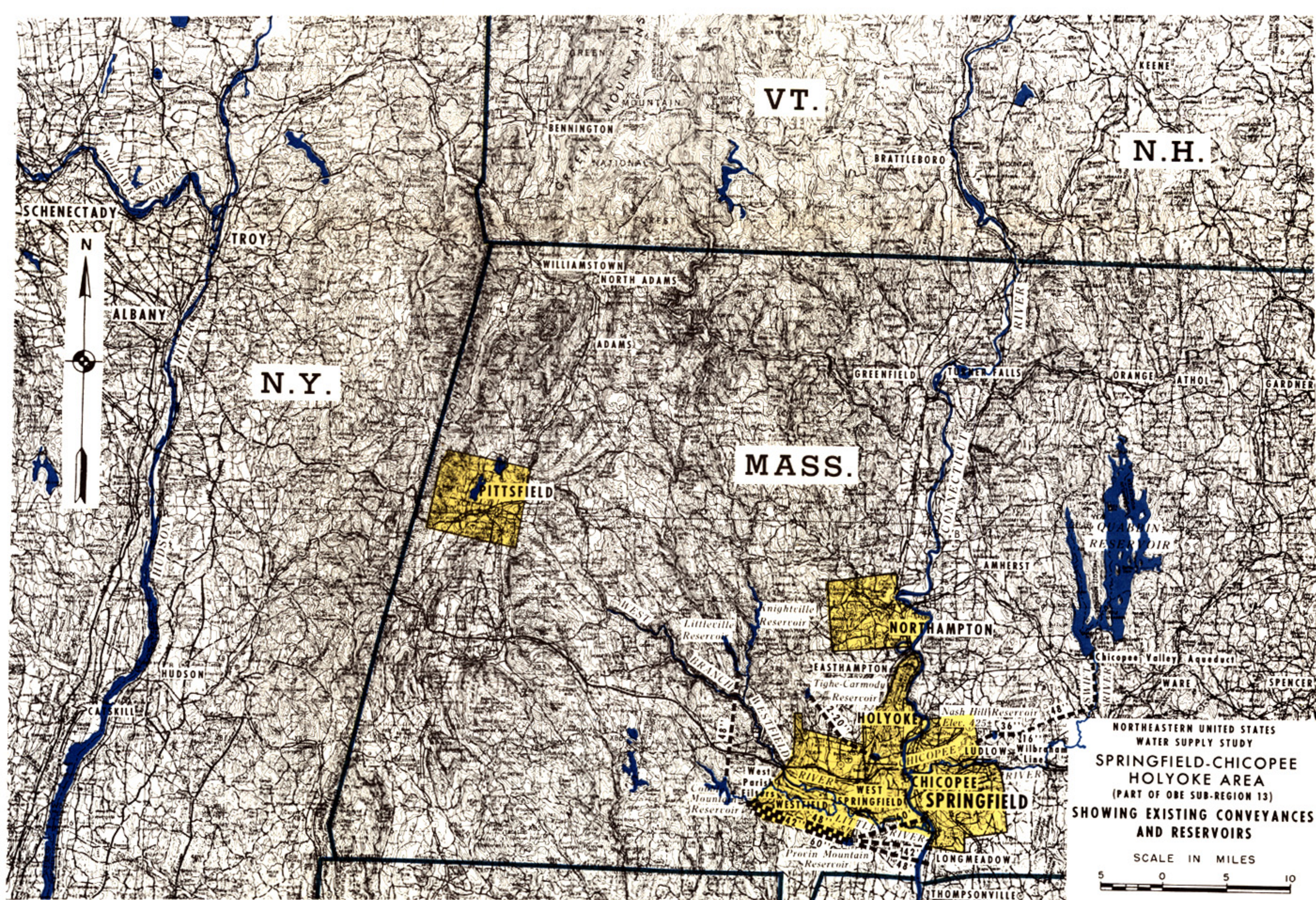
In order to insure an adequate and dependable future water supply for the sub-region, the following courses of action are recommended:

- A. Study and design of additional filters for the Springfield Water System which are considered an urgent need. Based upon the \$2,000,000 construction costs of filters recently added to the system, it is estimated that design of this item could cost about \$100,000 and could be included under the criteria of major treatment facilities as noted in Title I, Public Law 89-298, 89th Congress, 27 October 1965.
- B. Study of the Chicopee Valley Aqueduct system and improvements required to adequately service its present coverage and to extend service to other municipalities as elaborated in page 10. The inadequacy of the present system is considered an urgent need. The engineering study would require funds of approximately \$15,000. <sup>(1)</sup>
- C. Study of the Springfield-Chicopee-Holyoke area alternatives for future regional system development, as outlined under "Further Study" on page 10 in order to insure future optimum development of the water supply systems of the area. This engineering study would provide detailed plans for the solution of future water supply problems of the area and is estimated to cost \$25,000. <sup>(1)</sup>
- D. Paragraphs A and B of the above recommendations are considered to be "urgent needs" while Paragraph C deals with future requirements of the sub-region.

(1) It should be noted that these cost estimates are initial requests only and during the course of studies a determination of any required additional study funds would be prepared and requested.









## LITTLE RIVER SUPPLY

### LITTLEVILLE DAM & RESERVOIR

ELEV. 518

PUMPING  
STATION

WATER AREA 275 ACRES  
DRAINAGE AREA 52 SQ. MI.  
CAPACITY 3.1 BIL. GAL.

COBBLE MTN. - BORDEN BR.  
DAM & RESERVOIR  
ELEV. 952

WATER AREA 1134 ACRES  
DRAINAGE AREA 48.5 SQ. MI.  
CAPACITY 25.3 BIL. GAL.

WEST PARISH FILTERS  
ELEV. 465

FILTER AREA  
11.56 ACRES

PROVIN MTN. RES.  
ELEV. 405

CAPACITY  
60 MIL. GAL.



CONSUMER

Agawam  
East Longmeadow  
Longmeadow  
Southwick  
Springfield  
Portion of Westfield

## LUDLOW RESERVOIR SUPPLY

CHERRY VALLEY  
DAM & RESERVOIR  
ELEV. 373

WATER AREA  
440 ACRES  
DRAINAGE AREA  
20 SQ. MI.  
CAPACITY  
2 BIL. GAL.

Pumping Station  
& Filtration Plant

ELEV. 383

FILTER AREA  
4 ACRES

Distribution  
Basin

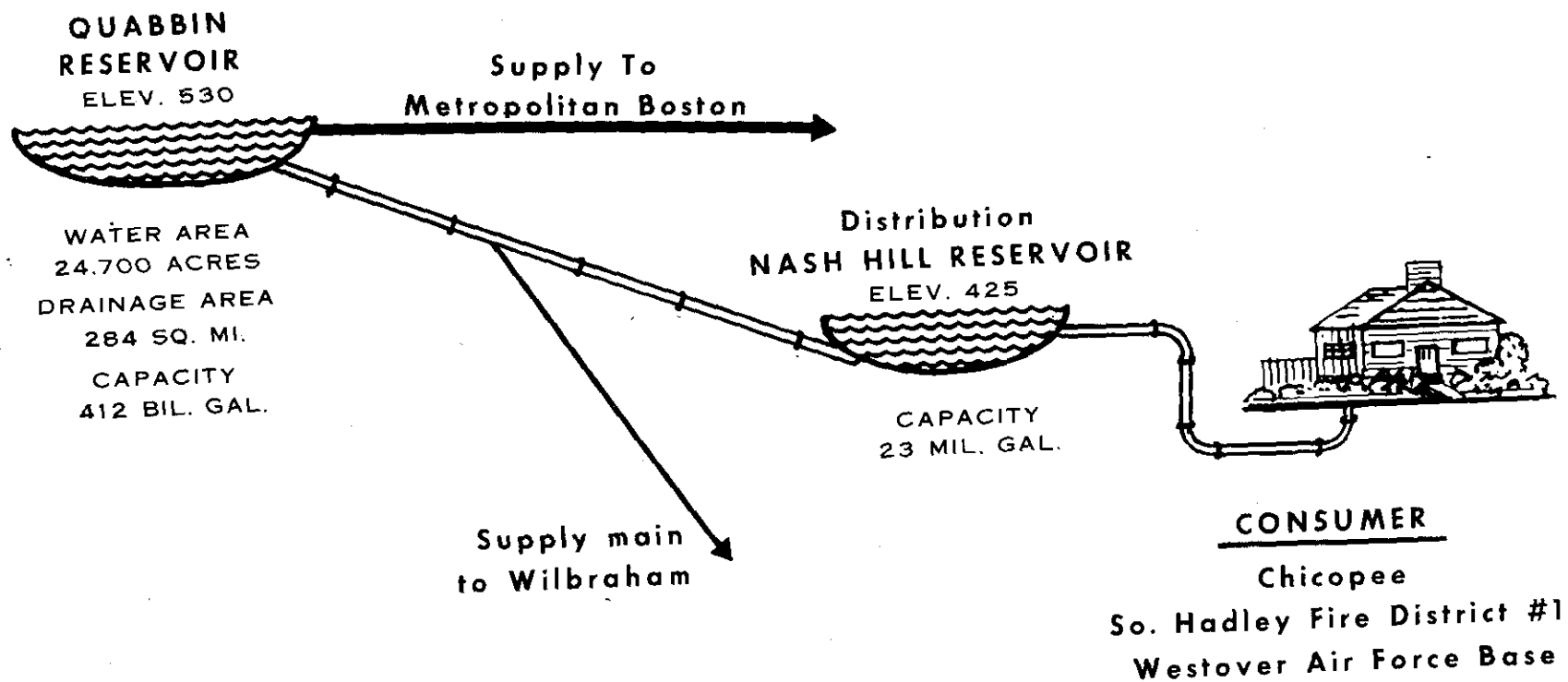
CAPACITY  
10 MIL. GAL.



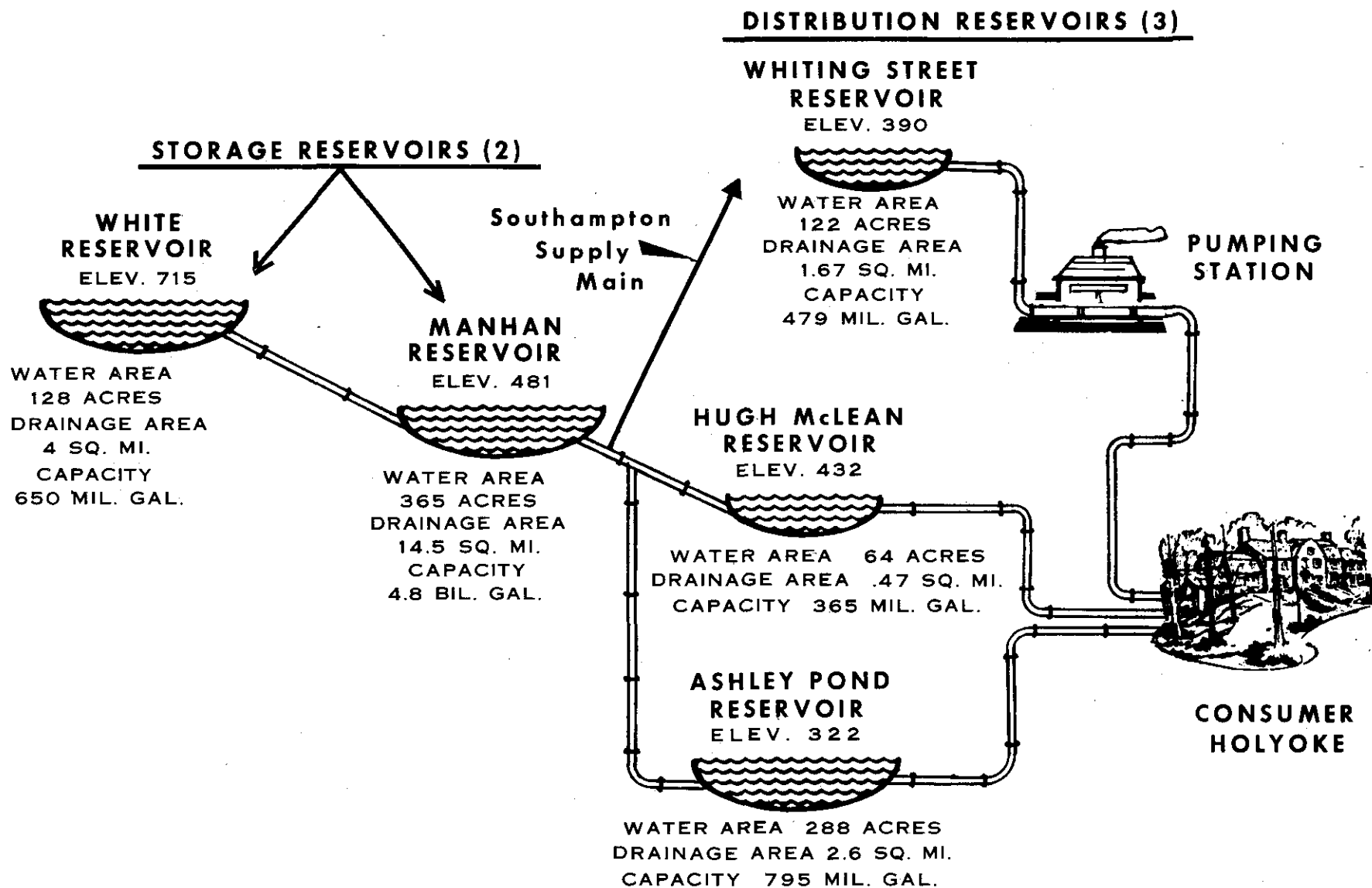
CONSUMER

Ludlow  
Monsanto Chemical Co.

# SPRINGFIELD WATER SYSTEM



## CHICOPEE VALLEY AQUEDUCT



**HOLYOKE WATER SYSTEM**